

Passively-Cooled Hyperspectral Infrared Detectors and Arrays, Phase I

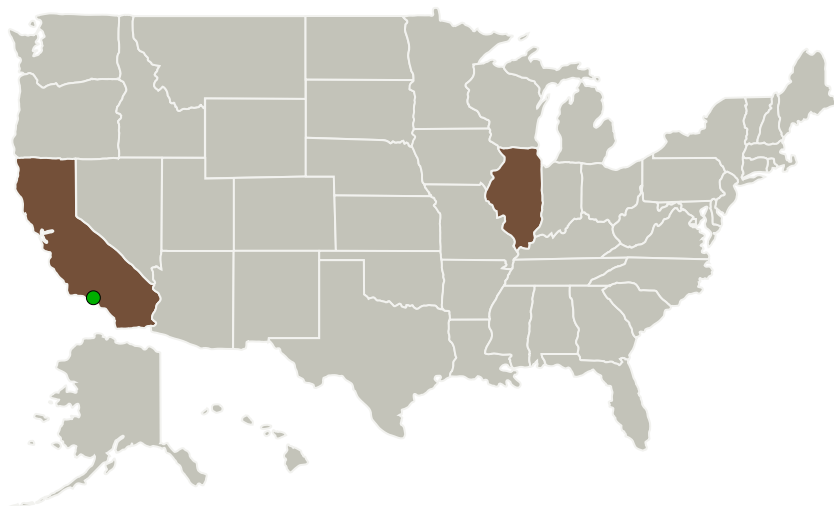
Completed Technology Project (2010 - 2010)



Project Introduction

A constant demand exists to improve the sensitivity of trace chemical species measurement systems, which is often limited by the performance of the infrared photon detector components. The significant cooling required to reduce dark currents and increase detectivities is a practical concern associated with these infrared detectors. For geostationary and low-Earth orbital platforms, passive cooling systems have been developed to provide a suitable means of incorporating such high-performance infrared detectors. The passive cooling system for the Crosstrack Infrared Sounder has provided a means to achieve a set point of 81 K for long-wavelength infrared detector operation. We will develop in this proposed effort the technology for high-performance, passively-cooled infrared (6-14 microns spectral range) detectors with integrated capabilities for Fabry-Perot spectroscopy. The proposed sensors will be based on HgCdTe material for high detectivities and use an Auger-suppression technique to reduce cooling requirements. HgCdTe detectors capable of operating under passive cooling conditions will be designed, fabricated and tested. In parallel, Fabry-Perot cavities suitable for future integration with the HgCdTe infrared detectors will be designed, fabricated and tested. The infrared detector arrays and tunable Fabry Perot cavities will be integrated in later phases of the proposed project.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
EPIR Technologies, Inc.	Lead Organization	Industry Small Disadvantaged Business (SDB)	Bolingbrook, Illinois
● Jet Propulsion Laboratory (JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations

California	Illinois
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Project Transitions

**January 2010:** Project Start**July 2010:** Closed out**Closeout Documentation:**

- Final Summary Chart(<https://techport.nasa.gov/file/139322>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

EPIR Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

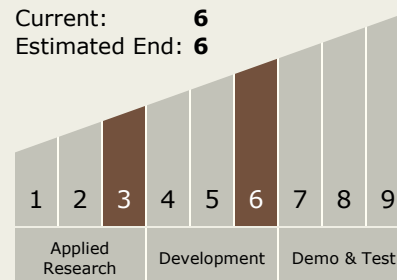
Carlos Torrez

Principal Investigator:

Silviu Velicu

Technology Maturity (TRL)

Start: 3
 Current: 6
 Estimated End: 6



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System